STEAM PROPULSION: NON NUCLEAR FULL POWER MEMO EXAMPLE

FROM: COMMANDING OFFICER, _____(SHIP)_____
TO: SENIOR ENGINEER, BOARD OF INSPECTION AND SURVEY, ATLANTIC

SUBJ: FULL POWER TRIAL

REF: (A) EOSS (IF APPLICABLE)
(B) OPNAVINST 9094.1B
(C) INSURVINST 4730.1B
(D) NSTM CH. 231 (PROPULSION TURBINES)
(E) (APPLICABLE PROPULSION PLANT TECH MANUAL)
(F) (PROPULSION OPERATING GUIDE)

ENCL: (1) FULL POWER BUILD-UP PROCEDURES AND PROCEDURES FOR QUICK REVERSAL DEMONSTRATIONS
(2) SHIP'S LOADING DATA AND FULL POWER AHEAD/ASTERN CALCULATIONS
(3) PROPULSION MACHINERY LIMITING PARAMETERS

1. IN ACCORDANCE WITH REFERENCES (A) THROUGH (F) A FULL POWER TRIAL WILL BE CONDUCTED ON (DATE). THE DURATION OF THE FULL POWER TRIAL WILL BE ONE HOUR.

2. THE COMMUNICATIONS SYSTEM USED TO COORDINATE THE COLLECTION OF DATA WILL BE THE _____(MC),____(PHONE CIRCUIT) ____. DATA AT ALL STATIONS WILL BE RECORDED AT THE COMMENCEMENT OF THE TRIAL AND AT 15 MINUTE INTERVALS THEREAFTER. ONE SET OF READINGS WILL ALSO BE TAKEN AT FULL POWER ASTERN OPERATION.

3. THE SHIP WAS UNDOCKED ON _____(DATE)_____.

4. THE SHIP'S LAST FULL (COMPLETE) WATERBORNE HULL CLEANING WAS COMPLETED ON _____(DATE)_____.

5. THE FOLLOWING EQUIPMENT IS NOT ALIGNED IN ACCORDANCE WITH REFERENCES (A) THROUGH (F).

EQUIPMENT/SYSTEM	**PLANT IMPACT**	**DFS/STANDING ORDER NUMBER**

6. THERE IS NO MACHINERY OUT OF COMMISSION THAT WILL ADVERSELY AFFECT THE OPERATION OF THE MAIN PROPULSION PLANT DURING THE FULL POWER TRIAL. (IF THERE IS ANY OUT OF COMMISSION MACHINERY THAT WILL EFFECT THE FULL POWER TRIAL LIST THEM):

EQUIPMENT	**PLANT IMPACT**

7. USS _____ IS READY IN ALL ASPECTS TO CONDUCT THE SUBJECT TRIAL.

_____

COMMANDING OFFICER

FULL POWER BUILD-UP PROCEDURES AND PROCEDURES FOR QUICK REVERSAL

1. PRIOR TO COMMENCEMENT OF THE FULL POWER TRIAL THE SHIP WILL BE UNDERWAY WITH THE FOLLOWING PRINCIPLE PROPULSION PLANT MACHINERY IN OPERATION:

(LIST MAIN PROPULSION PLANT EQUIPMENT LINEUP HERE)

- THE FOLLOWING PRINCIPLE AUXILIARY EQUIPMENT IN OPERATION

- ____ ____ FUEL OIL SERVICE PUMP(S)
- ____ ____ LUBE OIL PURIFIER(S)
- ____ ____ HPAC(S)
- ____ ____ LPAC(S)
- ____ ____ AUXILIARY MACHINERY COOLING WATER PUMP(S)
- ____ ____ MAIN CONDENSATE PUMP(S)
- ____ ____ SSDG(S) AND ASSOCIATED PUMPS(S)
- ____ ____ GEAR DRIVEN LUBE OIL SERVICE PUMP(S)
- ____ ____ LUBE OIL SERVICE PUMP(S) (STATUS)
- ____ ____ DISTILLING UNIT(S) AND ASSOCIATED PUMP(S)

2. SHAFT(S) WILL BE BROUGHT UP TO FULL POWER SRPM AND PITCH, SEE ENCLOSURE (2), IN STANDARD SPEED INCREMENTS, ALLOWING APPROXIMATELY __(TIME)__ BEFORE EACH SPEED INCREASE.

3. ONCE THE SHAFT(S) HAS/HAVE REACHED FULL POWER AND HAS/HAVE MAINTAINED REQUIRED SRPM AND PITCH FOR _____ MINUTES, AND THE CHIEF ENGINEER AND INSURV SENIOR ENGINEER AGREE, THE TIMED FULL POWER RUN WILL COMMENCE. DATA WILL BE COLLECTED AT THE COMMENCEMENT AND EVERY 15 MINUTES THEREAFTER FOR ONE HOUR. ALL PROPULSION AND AUXILIARY PLANT PARAMETERS WILL BE RECORDED AND PROVIDED TO THE INSURV SENIOR ENGINEER UPON COMPLETION. MANUAL AND AUTOMATED DATA WILL BE COLLECTED TO MEET THE REQUIREMENTS OF THE ENGINEERING TRIAL REPORT CONTAINED IN OPNAVINST 9094.1B FORM 9094/1D.

4. UPON COMPLETION OF ONE HOUR AT REQUIRED SRPM AND PITCH THE SHIP WILL CONDUCT FULL POWER AHEAD RUDDER SWING CHECKS.

5. UPON COMPLETION OF AHEAD FULL POWER RUDDER SWING CHECKS, THE SHIP WILL CONDUCT A QUICK REVERSAL FROM FULL POWER AHEAD TO FULL POWER ASTERN. FULL POWER ASTERN OPERATION WILL LAST FOR APPROXIMATELY 15 MINUTES. ONE ADDITIONAL SET OF READINGS WILL BE TAKEN WHEN THE PLANT HAS STABILIZED. THE QUICK REVERSAL WILL BE CONDUCTED IN STRICT ACCORDANCE WITH EOSS OR OTHER APPLICABLE PROPULSION PLANT MANUALS. THE THROTTLE CHANGE SHALL BE CONDUCTED IN ONE FLUID MOTION.

6. AFTER COMPLETION OF THE ASTERN FULL POWER TRIAL, THE SHIP WILL CONDUCT FULL POWER ASTERN RUDDER SWING CHECKS. MAXIMUM ASTERN RPM FOR RUDDER SWING CHECKS IS _____ RPM.

7. UPON COMPLETION OF ASTERN FULL POWER STEERING/RUDDER SWING CHECKS, THE SHIP WILL CONDUCT A QUICK REVERSAL FROM FULL POWER ASTERN TO FULL POWER AHEAD AND RETURN TO THE CALCULATED FULL POWER AHEAD SRPM/PITCH. IN ACCORDANCE WITH REFERENCE ( ), THE SHIP WILL MAINTAIN CALCULATED FULL POWER AHEAD SRPM FOR A MINIMUM OF FIVE MINUTES.

8. THE ENGINEER OFFICER OR ANY INSURV INSPECTOR WILL TERMINATE THE FULL POWER TRIAL IF, AT ANY TIME, THE PERFORMANCE/DATA IS QUESTIONABLE OR CONDITIONS EXIST THAT MAY ENDANGER EQUIPMENT OR PERSONNEL SAFETY.

SHIP'S LOADING DATA AND FULL POWER AHEAD/ASTERN CALCULATIONS

1. SHIP'S LOADING DATA

A. LIQUID LOAD (MAXIMUM)

FUEL OIL	100%	_____
DIESEL OIL	100%	_____
FRESHWATER	100%	_____
FEEDWATER	100%	_____
LUBE OIL	100%	_____
BALLAST	100%	_____

B. DRAFT AT NOMINAL DISPLACEMENT

FORWARD:
AFT:
MEAN:
DESIGN DISPLACEMENT: (TONS)
DESIGN DRAFT: (NAVIGATIONAL DRAFT)

C. LIQUID LOAD AT COMMENCEMENT OF TRIAL

FUEL OIL	_____
DIESEL OIL	_____
FRESHWATER	_____
RESERVE FEEDWATER	_____
LUBE OIL	_____
BALLAST	_____

D. PERCENT OF MAXIMUM LIQUID LOAD: _____% (MIN OF 75% PER OPNAVINST 9094)

E. MINIMUM DEPTH REQUIRED = $\frac{(10)\ X\ (H)\ X\ (V)}{L}$

WHERE: D = MINIMUM DEPTH (FEET)
H = TRIAL DEPTH (FEET)
V = SPEED OF RUN (KNOTS)
L - SQUARE ROOT OF LENGTH BETWEEN PERPENDICULARS (FEET)

2. REQUIRED FULL POWER SHAFT HORSEPOWER (SHP)/RPM IS:

3. REQUIRED FULL POWER ASTERN SHP/RPM IS:

MAIN PROPULSION MACHINERY LIMITING PARAMETERS

1. Boilers and Associated Equipment

COMPONENT/SYSTEM	FULL POWER DESIGN PARAMETER	MIN/MAX/ALARM SET POINT	REFERENCE
Steam Drum Pressure	PSI	PSI	
Superheater Outlet Temp	DEGREES	DEGREES	
Superheater Pressure	PSI	PSI	
Desuperheater Outlet Temp	DEGREES	DEGREES	
Economizer Inlet Temp	DEGREES	DEGREES	
Fuel Oil Manifold Pressure	PSI	PSI	
Economizer Outlet Temp	DEGREES	DEGREES	
Boiler Water Level	INCHES	INCHES	
Auxiliary Turbine LO Temp	DEGREES	DEGREES	
Lube Oil Cooler Outlet Temp	DEGREES	DEGREES	
Pressure Drop Across Desuperheater	PSI	PSI	
DFT Temps	DEGREES	DEGREES	
DFT Pressure	DEGREES	DEGREES	

2. Main Engines

COMPONENT/SYSTEM	FULL POWER DESIGN PARAMETER	MIN/MAX/ALARM SET POINT	REFERENCE
HP Turbine 1^{ST} Stage Pressure	PSI	PSI	
HP Turbine 1^{ST} Stage Temp	DEGREES	DEGREES	
Main Engine Vacuum	INCHES	INCHES	
LP Turbine 1^{ST} Stage Pressure	PSI	PSI	
LP Turbine 1^{ST} Stage Temp	DEGREES	DEGREES	
LO Temp from Cooler	DEGREES	DEGREES	
LO Temp from Main Engine Bearings	DEGREES	DEGREES	
Line Shaft Bearing LO Temps	DEGREES	DEGREES	
Astern Steam Pressure	PSI	PSI	
Rotor Position (Turbine Thrust HP/LP)	INCHES	INCHES	
LO Pressure to Main Engine Bearing	PSI	PSI	
LP Exh Pressure (Ahead/Astern)	PSI	PSI	
LP Turbine Astern Steam Pressure	PSI	PSI	